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TRASSIC PARK Closure/PC Cost Estimates.

Cost Estimate for Earth Excavation and Disposal of Contaminated Soil			
	Volume Excavated (cy)	Excavation Cost per cy (\$)	Total Cost (\$)
DRUM HANDLING UNIT (0.5 ft by 118 ft by 418 ft)	913	\$8.00	\$7,307
EVAPORATION POND UNIT (0.5 ft by 92,232 ft ²)	1,708	\$8.00	\$13,664
LIQUID WASTE RECEIVING AND STORAGE UNIT (0.5 ft by 35 ft by 42 ft)	27	\$8.00	\$218
STABILIZATION UNIT (0.5 ft by 123 ft by 118 ft)	269	\$8.00	\$2,150
ROLL-OFF STORAGE UNIT (0.5 ft by 414 ft by 330 ft)	2,530	\$8.00	\$20,240
LANDFILL UNIT (No contaminated soil will be excavated from the landfill unit)			
Notes 1) Dimensions based on Design Drawings dated April 2000. 2) Assumes that 0.5 ft thick layer underlying facility is contaminated 3) Assumes excavated material is disposed in landfill.			

Note costs are given as per ton for stabilization therefore this price should be 12/yd³

Cost Estimate for Site Unit Soil Sampling and Chemical Analysis			
	Number of Samples	Unit Cost of Sample Collection and Analysis (\$)	Total Cost (\$)
DRUM HANDLING UNIT	68	\$2,040	\$138,720
EVAPORATION POND UNIT	63	\$2,040	\$128,520
LIQUID WASTE RECEIVING AND STORAGE UNIT	11	\$2,040	\$22,440
STABILIZATION UNIT	8	\$2,040	\$16,320
ROLL-OFF STORAGE UNIT	71	\$2,040	\$144,840
LANDFILL UNIT	51	\$2,040	\$104,040

Notes

- 1) See worksheet for calculating number of soil samples required.
- 2) Chemical analysis cost based on ACZ Hazardous Waste Characteristics test suite.
- 3) Sampling assumed to be completed at a rate of 2 samples per hour. Cost for sampling assumed to be \$80/hour.

Cost Estimate for Earth Backfill at Excavated Contaminated Areas

	Volume Excavated (cy)	Backfill Cost per Cubic Yard (\$)	Total Cost (\$)
DRUM HANDLING UNIT (0.5 ft by 118 ft by 418 ft)	913	\$2.00	\$1,827
EVAPORATION POND UNIT (0.5 ft by 92,232 ft ²)	1,708	\$2.00	\$3,416
LIQUID WASTE RECEIVING AND STORAGE UNIT (0.5 ft by 35 ft by 42 ft)	27	\$2.00	\$54
STABILIZATION UNIT (0.5 ft by 123 ft by 118 ft)	269	\$2.00	\$538
ROLL-OFF STORAGE UNIT (0.5 ft by 414 ft by 330 ft)	2,530	\$2.00	\$5,060
LANDFILL UNIT (Volume of air space between Phase 1A waste volume and Phase 1A excavation)	ok 2,060,000	\$2.00	\$4,120,000

Notes

- 1) Dimensions based on Design Drawings dated April 2000.
- 2) Backfill unit cost based on experience with other projects in North America.
- 3) Backfill assumed to be placed in lifts but not compacted.



**Cost Estimate to Stabilize and Dispose of Remaining Waste
Inventory at Site Units at Closure Time**

	Waste Inventory (tons)	Reagent (tons)	Total Waste (tons)	Reagent Unit Cost per Ton (\$)	Waste Disposal Unit Cost per Ton (\$)	Total Cost (\$)
DRUM HANDLING UNIT						
Stabilize and Dispose of Waste Inventory	309	494	803	\$60	\$8	\$36,071
EVAPORATION POND UNIT	2533 2,936					
Stabilize and Dispose of Waste Inventory	2,936	4,698	7634	\$60	\$8	\$342,954
LIQUID WASTE RECEIVING AND STORAGE UNIT	92 81					
Stabilize and Dispose of Waste Inventory	81	765	846	\$60	\$8	\$52,668
STABILIZATION UNIT						
Stabilize and Dispose of Waste Inventory	162	259	421	\$60	\$8	\$18,922
ROLL-OFF STORAGE UNIT						
Stabilize and Dispose of Waste Inventory	6,415	10,264	16680	\$60	\$8	\$749,295

LANDFILL (Stabilization and disposal of remaining waste inventory not applicable to landfill unit)

Notes

- 1) Reagent cost includes material and mixing costs.
- 2) Waste disposal costs include loading material, hauling, and placement in the landfill
- 3) Reagent costs, mixing rates, and disposal rates based on telephone survey of hazardous waste disposal sites. All companies and sites provided information on condition of anonymity.

Note: Stabilization costs should include cost of stabilizing plus the cost of reagent \$90 - did not add the cost of stabilization into the cost calculations

Waste Inventory of Site Units at Closure Time

	Quantity	Units	Tons of Waste	Tons of Reagent
DRUM HANDLING UNIT (1)(5) 1,120 drums at 55 gal/drum	61,600	gal	309	494
EVAPORATION POND UNIT (2)(5) 2 ponds at 2ft by 225ft by 87ft each	78,300	ft ³	2,936	4,698
LIQUID WASTE RECEIVING AND STORAGE UNIT (3)(5) 2 tanks at 9,000 gals/tank	18,000	gal	81	765
STABILIZATION UNIT (4)(5) 4 bins at 100cy/bin, each 1/3 full	3,600	ft ³	162	259
ROLL-OFF STORAGE UNIT (4)(5) 132 containers at 40cy/container	142,560	ft ³	7920 6,415	10,264
LANDFILL (No waste to moved from the landfill at closure)				

Notes:

- 1) 7.48 gallons/cu. ft, waste density - 75 lbs/cu. ft., 1.6 tons reagent per 1 ton of waste
Waste density - 75 lbs/cu.ft., 1.6 tons reagent per 1 ton of waste
- 3) 85 lbs of reagent per gallon of liquid, liquid density is 9 lbs/gal
- 4) Waste density - 90 lbs/cu. ft, 1.6 tons of reagent per 1 ton of waste
- 5) Reagent costs and mixing rates based on telephone survey of hazardous waste disposal sites. All companies provided information on condition of anonymity.

**Cost Estimate to Stabilize and Dispose of Decontamination Water used for
Site Unit Equipment and Buildings at Closure Time**

	Decon Water Volume (gal)	Waste Inventory (tons)	Reagent (tons)	Total Waste (tons)	Reagent Unit Cost per Ton (\$)	Waste Disposal Unit Cost per Ton (\$)	Total Cost (\$)
DRUM HANDLING UNIT Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
EVAPORATION POND UNIT Decontamination Water	2,500	11	106	118	\$60	\$8	\$7,315
LIQUID WASTE RECEIVING AND STORAGE UNIT Decontamination Water	2,500	11	106	118	\$60	\$8	\$7,315
STABILIZATION UNIT Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
ROLL-OFF STORAGE UNIT Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
DFILL (No decontamination associated with Landfill Unit)							
Notes							
1) 85 lbs of reagent used to treat each gallon of decontamination water, decon water 9 lbs/gal							
2) Reagent costs and mixing rates based on telephone survey of hazardous disposal sites. All companies and sites provided information on condition of anonymity.							

Cost Estimate to Dismantle Buildings at Site Units

	Building Length (ft)	Building Width (ft)	Building Height (ft)	Building Volume (ft ³)	Unit Cost per Cubic Foot (\$)	Total Cost (\$)
DRUM HANDLING UNIT						
Salvage Drum Handling Building	418	118	15	739,860	\$0.21	\$155,371
<i>600 yd³ debris</i>						
EVAPORATION POND UNIT						
No building dismantling at the Evaporation Pond Unit						
LIQUID WASTE RECEIVING AND STORAGE UNIT						
No building dismantling at the Liquid Waste Receiving and Storage Unit						
STABILIZATION UNIT						
Salvage Drum Stabilization Building	123	118	20	290,280	\$0.21	\$60,959
ROLL-OFF STORAGE UNIT						
No building dismantling at the Roll-Off Storage Unit						
LANDFILL UNIT						
No building dismantling at the Landfill Unit						
Notes:						
1) Demolition cost based on Means Site Work & Landscape Cost Data, pg 28.						

**Cost Estimate to Demolish and Dispose of
Site Units Flooring, Liner Systems, etc.**

	Demolition Volume (cy)	Disposal Cost per cy (\$)	Total Cost (\$)
DRUM HANDLING UNIT (3)(4) Concrete Floor Pad and Subfloor (1.5 ft by 118 ft by 418 ft)	2,740	\$8.00	\$21,922
EVAPORATION POND UNIT (3)(4) Liner System (3 ft by 92,232 sq ft)	10,248	\$8.00	\$81,984
LIQUID WASTE RECEIVING AND STORAGE UNIT (1)(2)(3) 2 Tanks 15,500 gal 2 Tanks 9,000 gal Concrete Pad (35 ft by 42 ft by 1 ft)	15 9 54	\$100.00 \$100.00 \$8.00	\$1,535 \$891 \$436
			\$2,862
STABILIZATION UNIT (3)(4) Various Equipment Concrete Pad (1 ft by 123 ft by 118 ft)	1,300 538	\$8.00 \$8.00	\$10,400 \$4,300
			\$14,700
ROLL-OFF STORAGE UNIT (3)(4) Soil Liner System (2 ft by 414 ft by 330 ft)	10,120	\$8.00	\$80,960
LANDFILL UNIT No material will be demolished in the landfill unit.			
Notes 1) Liquid waste tanks will be crushed to 10% of their storage volume 2) Liquid waste tanks disposal cost is higher due to specialized equipment and labor costs. 3) Unit cost includes material loading, hauling, and placement in the landfill unit. 4) Disposal costs based on telephone survey of hazardous waste disposal sites. All companies and sites provided information on condition of anonymity.			

Cost Estimate of Landfill Closure Items

Task	Quantity	Units	Unit Cost	Notes	Total Cost
Landfill Closure Items					
X Leachate Treatment Facility Construction	1	each	\$400,000	16	\$400,000
X Leachate Treatment Facility Operations	401,500	gal	\$0.08	1,16	\$32,120
Sump Vadose Zone Sampling and Analysis	4	each	\$2,000	1,5	\$8,000
Well Vadose Zone Monitoring System Sampling and Analysis	20	each	\$2,000	1, 17	\$40,000
Landfill Cover System Construction	1	each		2	\$2,372,508
Soil Sampling and Analysis	1	each		4	\$104,040
Certification of Closure Inspection	1	each		6	\$3,000
Certification of Closure Report	1	each		6	\$5,000
Final Plat Survey	30	hr	\$80.00	7	\$2,400
Landfill Post-Closure Items					
Facility Inspection	2,880	hr	\$70.00	8,9,15	\$201,600
Routine Landfill Cover Maintenance and Repair	30	yr	\$20,000	8,10	\$600,000
Severe Landfill Cover Erosion Damage Repair	30	yr	\$10,000	8,11	\$300,000
Perimeter Diversion Ditch Maintenance and Repair	30	yr	\$10,000	8,18	\$300,000
X Leachate Pumping and Treatment	6,022,500	gal	\$0.08	8,12	\$481,800
X Leachate Collection System Maintenance	960	hr	\$70	8,13	\$67,200
Well and Sump Vadose Zone Maintenance	960 ← 480	each	\$70	8,14	\$33,600
Sump Vadose Zone Sampling and Analysis	120	each	\$2,000	8,19	\$240,000
Vadose Zone Monitoring Wells Sampling and Analysis	600	each	\$2,000	8,17,19	\$1,200,000
Notation of Property Deed	1	each	\$2,500	20	\$2,500
Certification of Post-Closure Inspection	1	each		6	\$3,000
Certification of Post-Closure Report	1	each		6	\$5,000

Notes:

- 1) Closure period estimated to be 1 year.
- 2) See Landfill Cover Construction Cost Estimate for details.
- X 3) Estimated leachate flow rates for Phase 1A is 1,100 gal/day for 1 year (365 days) *how was this number 1100 gpd calculated?*
- 4) See Site Unit Soil Sampling and Chemical Analysis cost estimate for details.
- 5) Vadose zone monitoring to be completed quarterly (4 times/year). For closure period of 1 year represents 4 sampling rounds.
- 6) See Closure and Post-Closure Inspection and Report Cost Estimate spreadsheet.
- 7) Based on project surveying experience.
- 8) Post-closure period is 30 years.
- 9) Inspections will be completed monthly at 8 hours per inspection for 30 years.
- 10) Estimate \$20,000/year for maintenance.
- 11) Estimate \$10,000/year for erosion damage repair.
- 12) Conservatively estimate that leachate will decrease linearly over the post-closure period. *how was the number calculated?*
- 13) Estimate 8 hours/quarter, 4 quarters/year for post-closure period.
- 14) Estimate 4 hours/quarter, 4 quarters/year for vadose zone maintenance during post-closure period. *Pls like to see twice this because Dept. no take time if no leachate in 1st year*
- 15) Facility inspection includes: fence, locks, gates, warning signs, landfill cover, perimeter diversion ditch, leachate collection system, leak detection system, and vadose zone monitoring system.
- 16) Based on project experience.
- 17) There are 5 vadose zone monitoring wells. *6 wells so far*
- 8) Estimate \$10,000/year for diversion ditch maintenance costs.
- 19) Vadose zone sampling and analysis performed 4 quarters/year for post-closure period.
- 20) Based on attorney quote.

Landfill Closure Items

Cost Estimate for Closure and Post-Closure Inspection and Report for Site Units

	Quantity	Unit Cost (\$)	Total Closure Inspection Cost (\$)	Total Closure Report Cost (\$)
DRUM HANDLING UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
EVAPORATION POND UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
LIQUID WASTE RECEIVING AND STORAGE UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
STABILIZATION UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
ROLL-OFF STORAGE UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
LANDFILL UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
Post-Closure Inspection	1	\$3,000	\$3,000	
Post-Closure Report	1	\$5,000		\$5,000
Notes:				
1) Closure inspection assumes 30 hours of time at a rate of \$100/hour.				
2) Closure report assumes 50 hours of time at a rate of \$100/hour.				

Cost Estimate to Construct Landfill Cover System					
Task	Quantity	Units	Unit Cost	Total Cost	Percentage of Total Cost
Vegetation	1,486,534	sf	\$0.01	\$14,865	0.6%
Vegetative Cover (2.5 ft thick)	1,486,534	sf	\$0.16	\$237,845	10.0%
Geocomposite	1,486,534	sf	\$0.45	\$668,940	28.2%
60 mil Textured HDPE Geomembrane	1,486,534	sf	\$0.38	\$564,883	23.8%
GCL <i>Geosynthetic Clay Liner</i>	1,486,534	sf	\$0.38	\$564,883	23.8%
Prepared Subgrade (0.5 ft thick)	1,486,534	sf	\$0.04	\$59,461	2.5%
Protective Soil (1.5 ft thick)	1,486,534	sf	\$0.10	\$148,653	6.3%
Subtotal Direct	<i>1,486,534</i>	<i>sf</i>	<i>\$1.52</i>	\$2,259,532	95.2%
Contingency (5% of Subtotal)				\$112,977	4.8%
Total				\$2,372,508	100.0%

Notes:

- 1) Cost estimate based on surface area of the Phase 1A excavation area. This area is much larger than the surface area of the Phase 1A waste; therefore, it is conservative.
- 2) Unit costs based on project experience in North America, and adjusted for thickness of material layer.

Cost Estimate to Decontaminate Buildings and Equipment at Site Units			
	Hours	Unit Cost per Hour (\$)	Total Cost (\$)
DRUM HANDLING UNIT Salvage Drum Handling Building	120	\$60.00	\$7,200
EVAPORATION POND UNIT Remove Pump	4	\$60.00	\$240
LIQUID WASTE RECEIVING AND STORAGE UNIT Salvage Valves, Switchs, Electrical Panel	40	\$60.00	\$2,400
STABILIZATION UNIT Salvage Drum Stabilization Building	60	\$60.00	\$3,600
Salvage Reagent Silos	16	\$60.00	\$960
			\$4,560
ROLL-OFF STORAGE UNIT Roll-Off Units	40	\$60.00	\$2,400
LANDFILL UNIT No decontamination required at the Landfill Unit			
Notes:			
1) Unit cost to decontaminate is an estimated average cost of laborers and equipment.			

GANDY TRIASSIC PARK FACILITY
WORKSHEET FOR CALCULATING REQUIRED NUMBER OF SOIL SAMPLES

DESCRIPTION	1/2,000 ft ²
DRUM HANDLING UNIT	
(Closure Plan - Section 8.1.1.4)	
1. Beneath building floor = 118' x 418'	49,324
Beneath loading docks = 36' x 5' x 2'	360
	<u>49,684</u>
2. Floor drain sumps	7
3. Dock area	8
4. Drainage trenches - 90' at 1/20' = 4 x 7 trenches	28
Drum Handling Unit total	68
EVAPORATION POND	
(Closure Plan - Section 8.1.2.4)	
1. Surface Impoundment area	92,232
(area measured in CAD, including additional surface area for slopes)	
2. Leachate collection sumps - 1 per sump x 2 sumps	2
3. Tanker pad discharge - 37' at 1/10' = 4 x 2 pads	8
4. Concrete pad perimeter - 3 sides x 2 pads	6
Evaporation Pond total	63
LIQUID WASTE RECEIVING AND STORAGE	
(Closure Plan - Section 8.1.3.3)	
1. Receiving and Storage unit - 42' x 35' =	1470
(including concrete pad)	
2. Sumps - 1 per sump x 2 sumps	2
3. Tanks - 1 per tank x 2 tanks	2
4. Tank pad perimeter - 2 tanks x 3 sides + 1 shared side	7
Liquid Waste Receiving and Storage total	11
STABILIZATION UNIT	
(Closure Plan - Section 8.1.4.4)	
1. Stabilization unit building - 123' x 118' =	14514
2. Vent Bag house - 32' x 10' =	320
(not including gravel apron)	
Stabilization Unit total	14834

**GANDY TRIASSIC PARK FACILITY
WORKSHEET FOR CALCULATING REQUIRED NUMBER OF SOIL SAMPLES**

DESCRIPTION	1/2,000 ft ²
ROLL-OFF STORAGE AREA	
(Closure Plan - Sections 8.1.5, 8.1.1.4)	
1. Storage area - 414' x 330' = 136620 (measured to outside edge of berm)	69
2. Sumps - 1 per sump x 2 sumps	2
Roll-off Storage Area total	71
LANDFILL	
(Closure Plan - Sections 8.1.6)	
1. Perimeter of cover - 1 per 100' of haul road	
North perimeter road - 1160	
East perimeter road - 1460	
West perimeter road - 1360	
total 3980	40
2. Stormwater Runoff Basin and associated Drainage ditches - 1 per 40,000 ft ²	
Stormwater Runoff Basin - 460' x 860' = 395600	
Drainage ditches	
2 per perimeter road 7960	
South side of Phase I 1420	
Ditch to SW Basin 640	
total 405620	11
Landfill total	51
Total number of samples - All Facilities	272

Calculations based on Closure Plan and Facility Drawings in Triassic Park Hazardous Waste Facility Tech Law Review Copy. Calculations completed for three sampling frequency scenarios: 1/4,000 ft², 1/400 ft² and 1/2,000 ft².

SITE CLOSURE COST ESTIMATE	Cost (\$)
DRUM HANDLING UNIT	
Stabilization and Disposal of Remaining Drum Waste Inventory	\$36,071
Decontamination of Equipment and Buildings	\$7,200
Stabilization and Disposal of Decontamination Water	\$14,630
Dismantling and Moving Structure and Equipment	\$155,371
Dismantling and Disposal of Concrete Floor and Secondary Containment	\$21,922
Soil Sampling and Chemical Analysis	\$138,720
Excavation of Contaminated Soils	\$7,307
Earth Backfill for Excavated Contaminated Soils	\$1,827
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$391,047
EVAPORATION POND	
Stabilization and Disposal of Remaining Liquid Waste Inventory	\$342,954
Decontamination of Equipment	\$240
Stabilization and Disposal of Decontamination Water	\$7,315
Removal and Disposal of Liner and Leachate Collection System	\$81,984
Soil Sampling and Chemical Analysis	\$128,520
Excavation of Contaminated Soils	\$13,664
Earth Backfill for Excavated Contaminated Soils	\$3,416
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$586,093
LIQUID WASTE RECEIVING AND STORAGE UNIT	
Stabilization and Disposal of Remaining Waste Inventory	\$52,668
Decontamination of Equipment and Buildings	\$2,400
Stabilization and Disposal of Decontamination Water	\$7,315
Removal and Disposal of Tanks and Concrete Pad	\$2,862
Soil Sampling and Chemical Analysis	\$22,440
Excavation of Contaminated Soils	\$218
Earth Backfill for Excavated Contaminated Soils	\$54
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$95,957
STABILIZATION UNIT	
Stabilization and Disposal of Remaining Waste Inventory	\$18,922
Decontamination of Equipment and Buildings	\$4,560
Stabilization and Disposal of Decontamination Water	\$14,630
Dismantling and Salvaging Tanks, Ancillary Equipment, and Building	\$60,959
Removal and Disposal of Equipment and Concrete Pad	\$14,700
Soil Sampling and Chemical Analysis	\$16,320
Excavation of Contaminated Soils	\$2,150
Earth Backfill for Excavated Contaminated Soils	\$538
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$140,779

SITE CLOSURE COST ESTIMATE	Cost (\$)
ROLL-OFF STORAGE AREA	
Stabilization and Disposal of Remaining Waste Inventory	\$749,295
Decontamination of Equipment	\$2,400
Stabilization and Disposal of Decontamination Water	\$14,630
Demolition and Disposal of Liner System	\$80,960
Soil Sampling and Chemical Analysis	\$144,840
Excavation of Contaminated Soils	\$20,240
Earth Backfill for Excavated Contaminated Soils	\$5,060
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$1,025,425
LANDFILL	
Landfill Closure	
Landfill Excavation Backfill	\$4,120,000
Landfill Cover	\$2,372,508
Leachate Treatment Facility Construction	\$400,000
Leachate Treatment Facility Operations	\$32,120
Sump Vadose Zone Sampling and Analysis	\$8,000
Well Vadose Zone Monitoring System Sampling and Analysis	\$40,000
Soil Sampling and Analysis	\$104,040
Final Plat Survey	\$2,400
Certification of Closure Inspection	\$3,000
Certification of Closure Report	\$5,000
Subtotal	\$7,087,068
Total Closure Cost (all units)	\$9,326,369
Landfill Post-Closure	
Facility Inspection	\$201,600
Routine Landfill Cover Maintenance and Repair	\$600,000
Severe Landfill Cover Erosion Damage Repair	\$300,000
Perimeter Diversion Ditch Maintenance and Repair	\$300,000
Leachate Pumping and Treatment	\$481,800
Leachate Collection System Maintenance	\$67,200
Well and Sump Vadose Zone Maintenance	\$33,600
Sump Vadose Zone Sampling and Analysis	\$240,000
Vadose Zone Monitoring Wells Sampling and Analysis	\$1,200,000
Notation of Property Deed	\$2,500
Certification of Post-Closure Inspection	\$3,000
Certification of Post-Closure Report	\$5,000
Subtotal	\$3,434,700
Total Closure Cost + Post-Closure Costs	\$12,761,069

Chemical Testing of Decon Water

Cost Estimate for Site Unit Soil Sampling and Chemical Analysis			
	Number of Samples	Unit Cost of Sample Collection and Analysis (\$)	Total Cost (\$)
DRUM HANDLING UNIT	1	\$2,040	\$2,040
EVAPORATION POND UNIT	1	\$2,040	\$2,040
LIQUID WASTE RECEIVING AND STORAGE UNIT	1	\$2,040	\$2,040
STABILIZATION UNIT	1	\$2,040	\$2,040
ROLL-OFF STORAGE UNIT (5)	0	\$2,040	\$0
TRUCK WASH UNIT	1	\$2,040	\$2,040
LANDFILL UNIT (6)	0	\$2,040	\$0
Notes			
1) Due to homogeneous nature of decon water only 1 sample will be taken.			
2) Decon water will go to 1 tank so only 1 sample will be taken for each facility			
3) Chemical analysis cost based on ACZ Hazardous Waste Characteristics test suite.			
4) Sampling assumed to be completed at a rate of 2 samples per hour. Cost for sampling assumed to be \$80/hour.			
5) Roll-off storage unit requires no decontamination.			
6) Landfill unit requires no decontamination.			

Revegetation

Cost Estimate to Revegetate Site Units

	Area Length (ft)	Area Width (ft)	Building Area (acres)	Unit Cost per Acre (\$)	Total Cost (\$)
DRUM HANDLING UNIT	418	220	2.11	\$10,835.82	\$22,876
EVAPORATION POND UNIT	310	305	2.17	\$10,835.82	\$23,520
LIQUID WASTE RECEIVING AND STORAGE UNIT	84	35	0.07	\$10,835.82	\$731
STABILIZATION UNIT	123	200	0.56	\$10,835.82	\$6,119
ROLL-OFF STORAGE UNIT	430	360	3.55	\$10,835.82	\$38,507
TRUCK WASH UNIT	37	57	0.05	\$10,835.82	\$525
	33	130	0.10	\$10,835.82	\$1,067
					\$1,592
LANDFILL UNIT (SEE LANDFILL COVER COSTS)					

Notes:

1)

Closure Certification

Cost Estimate for Closure and Post-Closure Inspection and Report for Site Units				
		Unit	Total	Total
		Cost	Closure	Closure
	Quantity	(\$)	Inspection	Report
			Cost	Cost
			(\$)	(\$)
DRUM HANDLING UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
EVAPORATION POND UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
LIQUID WASTE RECEIVING AND STORAGE UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
STABILIZATION UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
ROLL-OFF STORAGE UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
TRUCK WASH UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$5,000		\$5,000
LANDFILL UNIT				
Closure Inspection	1	\$3,000	\$3,000	
Closure Report	1	\$15,000		\$15,000
Post-Closure Inspection	1	\$3,000	\$3,000	
Post-Closure Report	1	\$150,000		\$150,000
Notes:				
1) Closure inspection assumes 30 hours of time at a rate of \$100/hour.				
2) Closure report assumes 100 hours of time at a rate of \$100/hour.				
3) Landfill closure report assumes 150 hours of time at a rate of \$100/hour.				
4) Post Closure reports assumes 300 hours of time at a rate of \$100/hour.				

Contam. Excavation

Cost Estimate for Earth Excavation and Disposal of Contaminated Soil			
	Volume Excavated (cy)	Excavation Cost per cy (\$)	Total Cost (\$)
DRUM HANDLING UNIT (0.5 ft by 118 ft by 418 ft)	913	\$8.00	\$7,307
EVAPORATION POND UNIT (0.5 ft by 92,232 ft ²)	1,708	\$8.00	\$13,664
LIQUID WASTE RECEIVING AND STORAGE UNIT (0.5 ft by 35 ft by 42 ft) * 2	54	\$8.00	\$436
STABILIZATION UNIT (0.5 ft by 123 ft by 118 ft)	269	\$8.00	\$2,150
ROLL-OFF STORAGE UNIT (0.5 ft by 414 ft by 330 ft)	2,530	\$8.00	\$20,240
TRUCK WASH UNIT (0.5 ft by 57 ft by 37 ft) (0.5 ft by 33 ft by 82ft)	89	\$8.00	\$713
LANDFILL UNIT (No contaminated soil will be excavated from the landfill unit)			
Notes			
1) Dimensions based on Design Drawings dated April 2000.			
2) Assumes that 0.5 ft thick layer underlying facility is contaminated			
3) Assumes excavated material is disposed in landfill.			

Backfill

Cost Estimate for Earth Backfill at Excavated Contaminated Areas			
		Backfill	
		Cost	
	Volume	per Cubic	Total
	Excavated	Yard	Cost
	(cy)	(\$)	(\$)
DRUM HANDLING UNIT (0.5 ft by 118 ft by 418 ft)	913	\$2.00	\$1,827
EVAPORATION POND UNIT (0.5 ft by 92,232 ft ²)	1,708	\$2.00	\$3,416
LIQUID WASTE RECEIVING AND STORAGE UNIT (0.5 ft by 35 ft by 42 ft) * 2	54	\$2.00	\$109
STABILIZATION UNIT (0.5 ft by 123 ft by 118 ft)	269	\$2.00	\$538
ROLL-OFF STORAGE UNIT (0.5 ft by 414 ft by 330 ft)	2,530	\$2.00	\$5,060
TRUCK WASH UNIT (0.5 ft by 57 ft by 37 ft) (0.5 ft by 33 ft by 82ft)	89	\$2.00	\$178
LANDFILL UNIT (Volume of air space between Phase 1A waste volume and Phase 1A excavation)	2,060,000	\$2.00	\$4,120,000
Notes			
1) Dimensions based on Design Drawings dated April 2000.			
2) Backfill unit cost based on experience with other projects in North America.			
3) Backfill assumed to be placed in lifts but not compacted.			

Soil Sampling

Cost Estimate for Site Unit Soil Sampling and Chemical Analysis			
		Unit Cost of Sample Collection	
	Number of Samples	and Analysis (\$)	Total Cost (\$)
DRUM HANDLING UNIT	68	\$2,040	\$138,720
EVAPORATION POND UNIT	63	\$2,040	\$128,520
LIQUID WASTE RECEIVING AND STORAGE UNIT	30	\$2,040	\$61,200
STABILIZATION UNIT	16	\$2,040	\$32,640
ROLL-OFF STORAGE UNIT	71	\$2,040	\$144,840
TRUCK WASH UNIT	8	\$2,040	\$16,320
LANDFILL UNIT	51	\$2,040	\$104,040
Notes			
1) See worksheet for calculating number of soil samples required.			
2) Chemical analysis cost based on ACZ Hazardous Waste Characteristics test suite.			
3) Sampling assumed to be completed at a rate of 2 samples per hour. Cost for sampling assumed to be \$80/hour.			

Cost Estimate to Decontaminate Buildings and Equipment at Site Units			
	Hours	Unit Cost per Hour (\$)	Total Cost (\$)
DRUM HANDLING UNIT			
Salvage Drum Handling Building	120	\$60.00	\$7,200
EVAPORATION POND UNIT			
Remove Pump	4	\$60.00	\$240
LIQUID WASTE RECEIVING AND STORAGE UNIT			
Salvage Valves, Switchs, Electrical Panel	40	\$60.00	\$2,400
STABILIZATION UNIT			
Salvage Drum Stabilization Building	60	\$60.00	\$3,600
Salvage Reagent Silos	16	\$60.00	\$960
			\$4,560
ROLL-OFF STORAGE UNIT			
See Note 2	0	\$60.00	\$0
TRUCK WASH UNIT			
See Note 3	0	\$60.00	\$0
LANDFILL UNIT			
No decontamination required at the Landfill Unit			
Notes:			
1) Unit cost to decontaminate is an estimated average cost of laborers and equipment.			
2) No equipment or buildings to decontaminate.			
3) No deconning will be completed due to limited salvage value. All material will be disposed in landfill.			

Cost Estimate to Dismantle Buildings at Site Units						
	Building Length (ft)	Building Width (ft)	Building Height (ft)	Building Volume (ft ³)	Unit Cost per Cubic Foot (\$)	Total Cost (\$)
DRUM HANDLING UNIT						
Salvage Drum Handling Building	418	118	15	739,860	\$0.03	\$22,196
EVAPORATION POND UNIT						
No building dismantling at the Evaporation Pond Unit						
LIQUID WASTE RECEIVING AND STORAGE UNIT						
No building dismantling at the Liquid Waste Receiving and Storage Unit						
STABILIZATION UNIT						
Salvage Drum Stabilization Building	123	118	20	290,280	\$0.08	\$23,222
ROLL-OFF STORAGE UNIT						
No building dismantling at the Roll-Off Storage Unit						
LANDFILL UNIT						
No building dismantling at the Landfill Unit						
Notes:						
1) Demolition cost based on Means Site Work & Landscape Cost Data, pg 28.						

Cost Estimate to Demolish and Dispose of Site Units Flooring, Liner Systems, etc.			
	Demolition Volume (cy)	Disposal Cost per cy (\$)	Total Cost (\$)
DRUM HANDLING UNIT (3)(4)			
Concrete Floor Pad and Subfloor (1.5 ft by 118 ft by 418 ft)	2,740	\$45.00	\$123,310
EVAPORATION POND UNIT (3)(4)			
Concrete Floor Pad (1 ft by 60 ft by 36 ft)	80	\$45.00	\$3,600
Pad Sand and Clay Liner (4 ft by 60 ft by 36 ft)	320	\$8.00	\$2,560
Liner System (3 ft by 92,232 sq ft)	10,248	\$8.00	\$81,984
			\$88,144
LIQUID WASTE RECEIVING AND STORAGE UNIT (1)(2)(3)			
4 Tanks 15,500 gal	31	\$200.00	\$6,140
4 Tanks 9,000 gal	18	\$200.00	\$3,565
Concrete Pad (35 ft by 42 ft by 1 ft) * 2	109	\$45.00	\$4,900
			\$14,605
STABILIZATION UNIT (3)(4)			
Various Equipment	1,300	\$8.00	\$10,400
Concrete Pad (1 ft by 123 ft by 118 ft)	538	\$45.00	\$24,190
			\$34,590
ROLL-OFF STORAGE UNIT (3)(4)			
Soil Liner System (2 ft by 414 ft by 330 ft)	10,120	\$8.00	\$80,960
TRUCK WASH UNIT (1)(2)(3)(4)			
3 Tanks 9,000 gal	13	\$200.00	\$2,674
Liner System (1 ft Foundation Sand)	203	\$8.00	\$1,622
Concrete Pad (1 ft by 57 ft by 37ft and 1 ft by 33 ft by 82 ft)	178	\$45.00	\$8,025
			\$12,321
LANDFILL UNIT (1)(2)(3)			
1 Tank 15,500 gal	8	\$200.00	\$1,535
1 Tank 9,000 gal	4	\$200.00	\$891
			\$2,426
Notes			
1) Liquid waste tanks will be crushed to 10% of their storage volume			
2) Liquid waste tanks disposal cost is higher due to specialized equipment and labor costs.			
3) Unit cost includes material loading, hauling, and placement in the landfill unit.			
4) Disposal costs based on telephone survey of hazardous waste disposal sites. All companies and sites provided information on condition of anonymity.			

**Cost Estimate to Stabilize and Dispose of Remaining Waste
Inventory at Site Units at Closure Time**

	Waste Inventory (tons)	Reagent (tons)	Total Waste (tons)	Reagent Unit Cost per Ton (\$)	Waste Disposal Unit Cost per Ton (\$)	Total Cost (\$)
DRUM HANDLING UNIT						
Stabilize and Dispose of Waste Inventory	309	494	803	\$60	\$8	\$36,071
EVAPORATION POND UNIT						
Stabilize and Dispose of Waste Inventory	2,936	4,698	7634	\$60	\$8	\$342,954
LIQUID WASTE RECEIVING AND STORAGE UNIT						
Stabilize and Dispose of Waste Inventory	162	1,530	1692	\$60	\$8	\$105,336
STABILIZATION UNIT						
Stabilize and Dispose of Waste Inventory	180	288	468	\$60	\$8	\$21,024
ROLL-OFF STORAGE UNIT						
Stabilize and Dispose of Waste Inventory	7,128	11,405	18533	\$60	\$8	\$832,550
TRUCK WASH UNIT						
Stabilize and Dispose of Waste Inventory	45	72	117	\$60	\$8	\$5,270
LANDFILL (Stabilization and disposal of remaining waste inventory not applicable to landfill unit)						
Notes						
1) Reagent cost includes material and mixing costs.						
2) Waste disposal costs include loading material, hauling, and placement in the landfill						
3) Reagent costs, mixing rates, and disposal rates based on telephone survey of hazardous waste disposal sites. All companies and sites provided information on condition of anonymity.						

**Cost Estimate to Stabilize and Dispose of Decontamination Water used for
Site Unit Equipment and Buildings at Closure Time**

	Decon Water Volume (gal)	Waste Inventory (tons)	Reagent (tons)	Total Waste (tons)	Reagent Unit Cost per Ton (\$)	Waste Disposal Unit Cost per Ton (\$)	Total Cost (\$)
DRUM HANDLING UNIT							
Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
EVAPORATION POND UNIT							
Decontamination Water	2,500	11	106	118	\$60	\$8	\$7,315
LIQUID WASTE RECEIVING AND STORAGE UNIT							
Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
STABILIZATION UNIT							
Decontamination Water	5,000	23	213	235	\$60	\$8	\$14,630
ROLL-OFF STORAGE UNIT							
Decontamination Water	0	0	0	0	\$60	\$8	\$0
TRUCK WASH UNIT							
Decontamination Water	0	0	0	0	\$60	\$8	\$0
LANDFILL (No decontamination associated with Landfill Unit)							
Notes							
1) 85 lbs of reagent used to treat each gallon of decontamination water, decon water 9 lbs/gal							
2) Reagent costs and mixing rates based on telephone survey of hazardous disposal sites. All companies and sites provided information on condition of anonymity.							
3) No decontamination will be completed at these units.							

Waste Inventory

Waste Inventory of Site Units at Closure Time					
	Quantity	Units	Tons of Waste	Tons of Reagent	
DRUM HANDLING UNIT (1)(5)					
1,120 drums at 55 gal/drum	61,600	gal	309	494	802.94
EVAPORATION POND UNIT (2)(5)					
2 ponds at 2ft by 225ft by 87ft each	78,300	ft ³	2,936	4,698	7,634.25
LIQUID WASTE RECEIVING AND STORAGE UNIT (3)(5)					
4 tanks at 9,000 gals/tank	36,000	gal	162	1530	1,692.00
STABILIZATION UNIT (4)(5)					
4 bins at 100cy/bin, each 1/3 full	3,600	ft ³	180	288	468.00
ROLL-OFF STORAGE UNIT (4)(5)					
132 containers at 40cy/container	142,560	ft ³	7,128	11,405	18,532.80
TRUCK WASH UNIT (1)(5)					
1 full refuse water tank at 9000 gal	9,000	gal	45	72	117.31
LANDFILL (No waste to moved from the landfill at closure)					
Notes:					
1) 7.48 gallons/cu. ft, waste density - 75 lbs/cu. ft., 1.6 tons reagent per 1 ton of waste					
2) Waste density - 75 lbs/cu. ft, 1.6 tons reagent per 1 ton of waste, waste does not have free liquids					
3) 85 lbs of reagent per gallon of liquid, liquid density is 9 lbs/gal					
Waste density - 100 lbs/cu. ft, 1.6 tons of reagent per 1 ton of waste, waste does not have free liquids					
4) Reagent costs and mixing rates based on telephone survey of hazardous waste disposal sites. All companies provided information on condition of anonymity.					